



TACTIC Program



Threat Agent Cloud Tactical Intercept and Countermeasure

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TACTIC Program



Overview

The TACTIC Program focuses on detection and knockdown/neutralization of chemical and biological threat agent clouds produced during military operations either through defensive measures against an adversary or by intentional agent dissemination/release by an adversary

Goal

The TACTIC Program seeks to actively protect the warfighter from such events and to provide a means to maintain critical military operations at the required tempo

Approach

- Develop critical technologies:
 - **TACTIC BEACONS**: standoff technologies that can rapidly detect, discriminate, and identify chemical and biological airborne clouds
 - **TACTIC BULLETS**: Methods to knockdown/neutralize threat agent clouds before they can reach military assets
- Construct and test prototype system

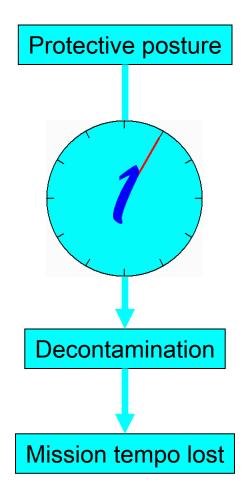
"time is of the essence"



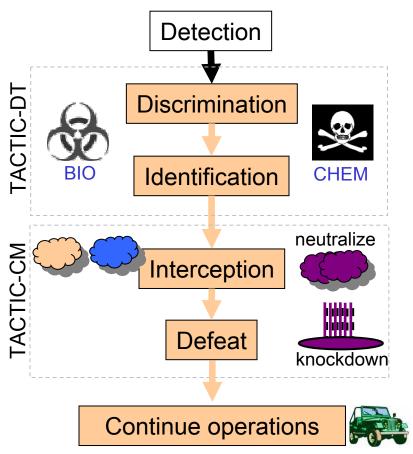
TACTIC Program: Paradigm Shift



Survive and Respond



Detect and Destroy



Development of discrimination/identification technologies (**BEACONS**) lowers the false-alarm rate, allows specific countermeasure responses (**BULLETS**), and reduces the number of times the countermeasure technology is deployed

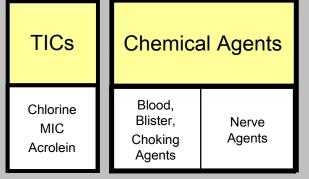


The Threat



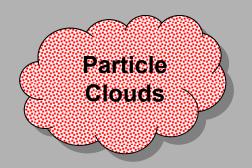


1 DETECTION



Toxins	Virus	Bacteria	
Neurotoxins Cytotoxins Enterotoxins Mycotoxins	DNA RNA	Spores	Vegetative Cells





2 COUNTERMEASURE



Existing Cloud Detection Triggers





<u>RADAR</u>

- High-resolution phased-array radars can detect and identify condensed clouds
- Use for early warning, long-range capability as part of a more comprehensive system

JLSCAD

- · Passive infrared detection system
- Discriminates between the chemical targets and the other non-toxic species in a complex battlefield environment
- Chemical agent cloud detection up to 5 kilometers away

XM94/Blackhawk

- Aerosol detection
- Range of 30km

LR-BSDS

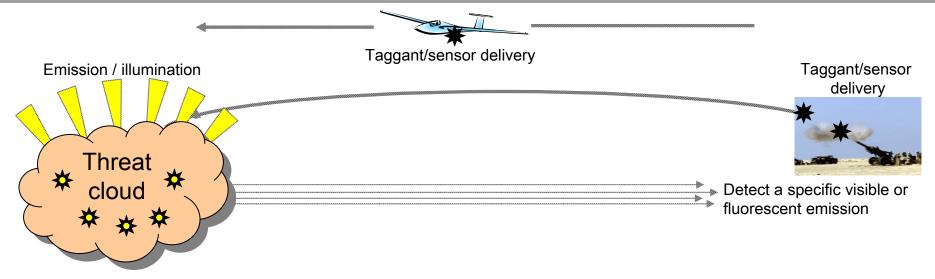
- Backscatter LIDAR technology will detect and track aerosol clouds at ranges up to 30km
- UV-LIDAR will provide some biological/non-biological discrimination
- Systems will provide information about the cloud configuration and location

DARPA

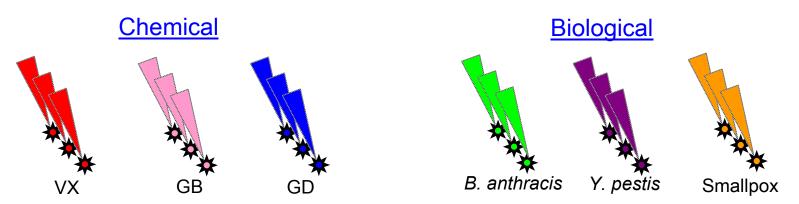
TACTIC BEACONS



Cloud Discrimination and Identification Technologies



Sensor communicates presence of chemical or biological agent OR taggant illuminates in the presence of a chemical or biological agent



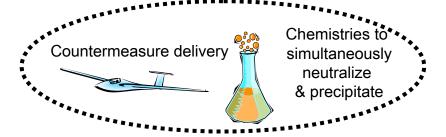
Detection within 1 minute



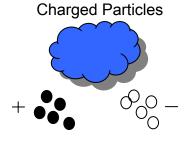
TACTIC BULLETS Cloud Countermeasure Technologies

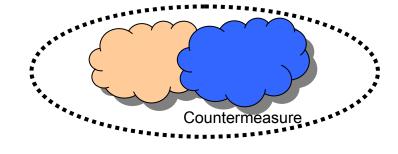




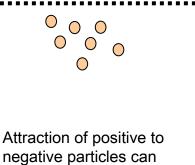








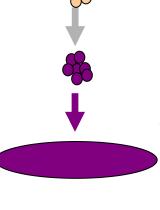




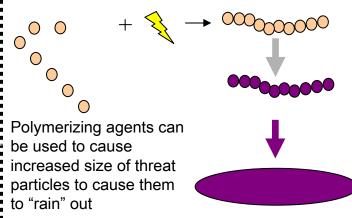
cause coagulation of

them to "rain" out

threat particles to cause



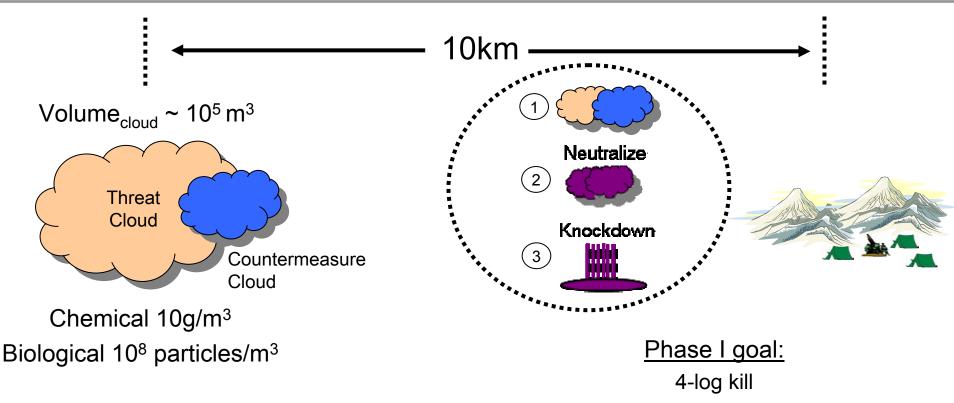






TACTIC Bullets Countermeasure Goals





Countermeasure acts within 5 minutes



TACTIC Technical Challenges



TACTIC BEACONS:

- Rapidly detect, discriminate, and identify the chemical or biological agent in air
- Timeframe ~ 1 minute

TACTIC BULLETS:

- Countermeasure the cloud by a factor of 10⁴
- Timeframe ~ 5 minutes

If TACTIC is successful, it shifts the battlefield paradigm:

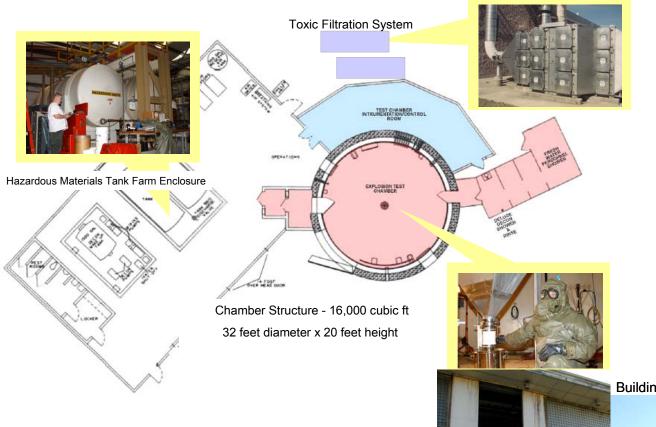
Survive and Respond ⇒ Detect and Destroy Passive Defensive ⇒ Force Projection



TACTIC Government Aerosol Test Facility



Toxic Explosive Chamber - JPM for NBC Contamination Avoidance Special Projects Office

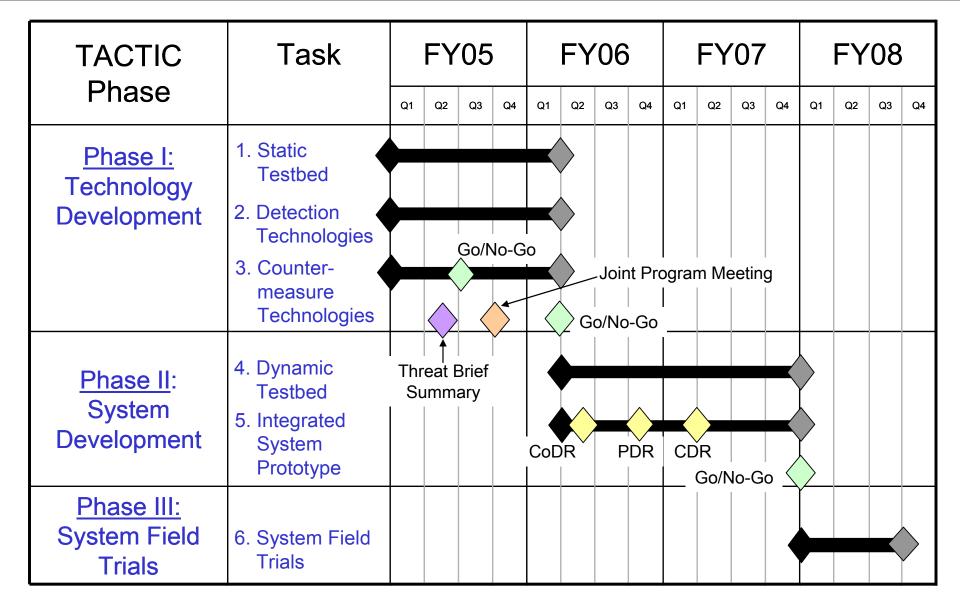


GOVERNMENT
AEROSOL TESTING
CHAMBERS
for TACTIC Program
Technologies



TACTIC Program Schedule







TACTIC Components



PHASE III PHASE I PHASE II **High-performance detection** Standalone Field detection Taggant based Trials capability Broad spectrum of agents Standoff Low P_{fa}; High P_d **System Integrated System Field Trials** High-efficiency countermeasure Standalone **Field** Low regret countermeasure Trials capability

- "Sticky", reactive particles coagulate when they collide with bioparticle causing "rainout" and decontamination
- Chemically driven sonic agglomeration causes particles to collide and stick
- Combination provides greatly enhanced collision rate of sticky particles; enhances "kill" and requires less chemical fuel
- Chemical (vapor/droplet clouds) agent Countermeasure

Biological (particle clouds) agent Countermeasure

- Particles break down the chemical agents by oxidation and hydrolysis at surfaces; particles act as catalysis for the oxidative reactions
- Pyrophoric materials injected into the cloud and ignited to oxidize (burn) the agent
- With catalytic particles, lower temperatures (smaller amounts) of pyrophoric agent is required

